

therefore, should be eliminated in order to make comparison with the Sun-spot curves. The mean monthly value of diurnal range having been found from the results for the years 1841 to 1877 for declination and horizontal force, and from the results for 1883 to 1888 for vertical force, the differences in each case between the several mean monthly values and the mean yearly value give corrections which, applied to the monthly values for any individual year, clear out the average annual inequality, leaving only the accidental irregularity remaining. In this way the irregular-looking curves of diurnal range of magnetic declination, horizontal force, and vertical force given in the plate are found.

The smoothed curves are formed as follows:—Assuming equality in the length of the several calendar months in each element, the mean of the first twelve values is taken, then the mean of the second to the thirteenth value, the mean of the third to the fourteenth value, and so on. Finally, the mean of each adjacent pair of the means so formed is taken, from which resulting values the smoothed curve is formed.

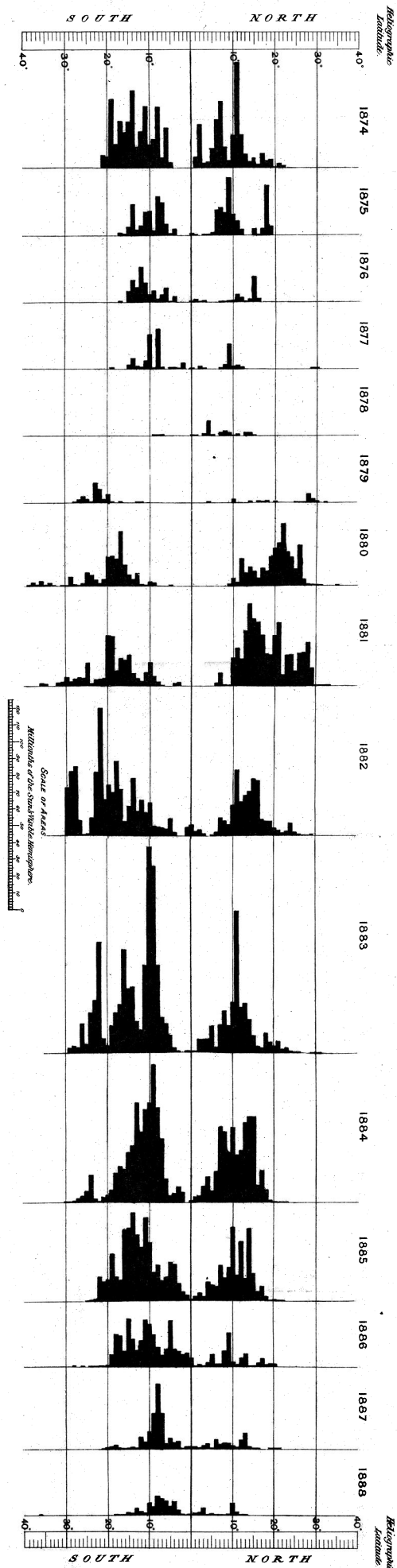
The declination range is given in angular measure, and those of horizontal force and vertical force in parts of the whole horizontal and vertical forces respectively, the scales being so arranged that equal changes of absolute magnetic force are represented by an equal length of ordinate. 1' of declination corresponds to $\cdot 0003$ of horizontal force, and to $\frac{\cdot 0003}{\tan \text{dip}} = \cdot 00012$ of vertical force, the values adopted in setting out the various scales.

Royal Observatory, Greenwich:
1889 November 8.

Mean Daily Area of Sun-spots for each Degree of Solar Latitude for each Year from 1874 to 1888, as measured on Photographs at the Royal Observatory, Greenwich.

(Communicated by the Astronomer Royal.)

The diagram on Plate II. has been laid down in the following manner. The total areas of whole spots as expressed in millionths of the Sun's visible hemisphere have been taken out for each degree of solar latitude for each year, and divided by the number of days of observation, to give the mean daily area. In apportioning the different spots to their respective latitudes the following rule has been observed. If the heliographic latitude of the centre of any single spot, or group of spots when measured as one, showed $\cdot 5$ or any higher figure in the decimal place, the entire area of the spot was taken as belonging to the next higher whole degree of latitude. If it showed $\cdot 4$ or any



Mean Daily Area of Sun-spots for each degree of Solar Latitude as measured on Photographs of the Sun, at the Royal Observatory, Greenwich, for the Years 1874 to 1888.

lower figure in the decimal place the entire area of the spot was taken as belonging to the degree of latitude indicated by the integral part of the number. Thus a spot at lat. $9^{\circ}.5$ was taken as wholly belonging to lat. 10° ; but one at $9^{\circ}.4$ to lat. 9° .

The diagram shows in a marked manner the gradual decline in the distance from the equator of Sun-spots as the minimum is approached, and the sudden appearance of spots in high latitudes immediately after the minimum is passed and a new cycle has commenced.

Royal Observatory, Greenwich:
1889 November 8.

Note on Solar Spots in high South Latitudes.

By Rev. S. J. Perry, D.Sc., F.R.S.

It may be well to draw attention to the spots in high latitudes that have been visible on the solar surface during the last few months. These spots were all in the southern hemisphere, and with the exception of two groups were visible only for a short period. The following table comprises those recorded at Stonyhurst:—

Date.	S. Latitude.	Longitude.	Recorded duration.
1888, Dec. 30	36°	195	1 day
1889, June 5	29	238	1 „
30	40	251	2 days
Aug. 2	$21^{\circ}.3$	155 to 165	36 „
Sept. 7	22	149.5 to 158.5	27 „
Oct. 8	$28^{\circ}.5$	9.5	1 day
10	25	24.5	1 „

The two large groups, whose latitude was not exceptionally high, form a narrow disturbed area extending over only 15° of longitude, and might almost be reckoned as a single disturbance, the first disappearing as the latter formed. The spot in latitude 40° , which was visible in England for two days, was also observed in North America. It is among the highest on record. The exceptional observations of Capocci, Peters, and Carrington all followed the minimum epoch of Sun-spots. The present increase in the number of spots in high latitudes agrees well with recorded observations of former minima.
